
Growth Conditions To Reduce Oxalic Acid Content of Spinach

A controlled-environment agricultural (CEA) technique to increase the nutritive value of spinach has been developed. This technique makes it possible to reduce the concentration of oxalic acid in spinach leaves. It is desirable to reduce the oxalic acid content because oxalic acid acts as an anti-nutritive calcium-binding component. More than 30 years ago, an enzyme (an oxidase) that breaks down oxalic acid into CO₂ and H₂O₂ was discovered and found to be naturally present in spinach leaves. However, nitrate, which can also be present

because of the use of common nitrate-based fertilizers, inactivates the enzyme. In the CEA technique, one cuts off the supply of nitrate and keeps the spinach plants cool while providing sufficient oxygen. This technique provides the precise environment that enables the enzyme to naturally break down oxalate. The result of application of this technique is that the oxalate content is reduced by 2/3 in one week.

*This work was done by Corinne Johnson-Rutzke of Cornell Research Foundation, Inc., for **Kennedy Space Center**.*

In accordance with Public Law 96-517, the contractor has elected to retain title to this invention. Inquiries concerning rights for its commercial use should be addressed to

John Brenner

Cornell Research Foundation

20 Thornwood Drive, Suite 105

Ithaca, NY 14850

Tel. No.: (607) 257-1081

E-mail: jrbff@cornell.edu

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